SUMMARY OF ILLNESSES AND INJURIES DUE TO OCCUPATIONAL EXPOSURE TO PESTICIDE RESIDUES IN THE FIELD REPORTED BY PHYSICIANS IN 1982

by

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SUMMARY

There were 323 cases of illnesses and injuries due to occupational exposure to pesticide residues in the field reported in 1982. This group of workers includes those who do picking, thinning, pruning, cultivation, irrigation, and transplanting in fields, orchards, vineyards, and greenhouses. Of the 323, there were 80 systemic illnesses, 31 eye injuries, 199 skin injuries, and 13 eye and skin injuries. Two incidents accounted for 50 of the systemic illnesses. In one, 33 became ill due to exposure to mevinphos, Metasystox-R, and Dithane in a cauliflower field when they were ordered to enter, in violation of a three-day reentry interval. In the other incident, 17 workers became ill after resting in a posted orange grove that had been treated with parathion. Of the 243 topical (eye and/or skin) injuries, 103 were associated with exposure to sulfur, most often in grape vineyards. There was a reported total of 542 days of disability and 30 days of hospitalization reported for workers in this classification.

INTRODUCTION

This illness data was compiled using reports filed by treating physicians and follow-up investigations by county agricultural commissioners' staffs. Under Section 2950 of the California Health and Safety Code, any physician who suspects an illness or injury has been caused by a pesticide is required to report it within 24 hours to the county health officer, who subsequently reports it to the county agricultural commissioner, the Department of Food and Agriculture, and the Department of Health Services. Reported incidents are investigated by the county agricultural commissioners' staffs and filed with the Worker Health and Safety Unit of the Department of Food and Agriculture.

There were 2,522 reports received from physicians in 1982 suspected to be caused by exposure to pesticides. Of these, 1,334 had adequate investigatory data available and were judged to have some degree of likelihood to be pesticide-related occupational illnesses or injuries. The remainder had inadequate investigatory data, were nonoccupational exposures, or were found (upon investigation) to not have had a pesticide exposure-related illness.

This classification of employees, "Exposure to Pesticide Residue in the Field," is comprised of those whose exposure was to foliar and soil residues of pesticides. Their activities at the time of exposure includes picking, thinning, pruning, cultivating, transplanting, and irrigating in fields, orchards, vineyards, nurseries, and greenhouses. There were 323 such cases in 1982. This differs from classifications used by the Department in previous years. It includes three previously used classifications: (1) "Field Workers," those exposed to pesticide residues while engaged in hand contact activities in production agriculture; (2) "Tractor Driver/ Irrigator," those exposed to pesticide residues while engaged in these activities which normally involve significantly less foliar contact; and (3) "Nursery/Greenhouse Worker, Residue," those exposed to pesticide residues in wholesale and retail nurseries, greenhouses, and mushroom houses. Of the total 323 cases reported in 1982, 277 are from Group #1, 35 are from Group #2, and 12 are from Group #3.

In addition to classification by illness type and work activity, the relationship between the circumstances of exposure and reported signs and symptoms is judged. This is done for each case using data available from the doctor's report, investigation report, and all publicly available toxicological and medical data. Classifications used are "Definite," "Probable," "Possible," and "Unlikely."

INCIDENTS REPORTED

There were 323 reports received by the Department which were classified in this job classification. Of the 323, 80 were systemic illnesses. Systemic illnesses are generally the most serious illnesses and, therefore, the ones on which regulatory policy focus most. The remaining 243 cases reported were topical injuries including 31 eye, 199 skin, and 13 eye and skin injuries.

The 323 case reports were classified with the following exposure/symptom relationship: 20 Definite, 51 Probable, 159 Possible, and 93 Unlikely. Those classified as "Unlikely" will be deleted from much of the remainder of this report. The reason for this is that if the data available in these case reports is to be used most effectively by the Department in formulating regulatory policy, it should be based on data of quality and relevance. The subtotal of cases, not counting those classified as "Unlikely" is 230. Of these 230, there were 66 systemic, 16 eye, 136 skin, and 12 eye and skin cases.

The attached tables describe the reported illnesses and injuries to workers in this job classification. Table 1 shows the type of illness reported by workers in this job classification, and for each of the groups as described in the introduction. Table 1(a) shows the same data for all cases, excluding those with an unlikely exposure/symptom relationship.

Table 2 shows the causal pesticide reported for each of the cases in this classification. Table 2(a) shows the causal pesticide, excluding those with an unlikely exposure/symptom relationship.

Tabel 3 shows the crops which had been treated with the pesticide that the workers were exposed to. Table 3(a) shows the crops, but excludes those cases with an unlikely exposure/symptom relationship.

Graph 1 shows the recent history of occupational pesticide-related illnesses in California, from 1974 through 1982. There have been several factors which influenced the number of reports received. These are discussed in other documents released by the Department. Note that this graph includes only occupational illness and injury reports. For purposes of comparison with previous year's data, cases with an "Unlikely" exposure/symptom relationship are excluded for 1982, and only Group #1 (farm field workers) cases are presented in the third column.

There were seven incidents, involving 57 cases, of worker illness that developed following their entry into fields treated with pesticides before the expiration of a required safety interval. Not all of these incidents involve illegal entry, since such intervals only apply to persons having "substantial and prolonged body contact with treated plants." In the largest such incident, a group of 35 workers was ordered into a cauliflower field in Monterey County on the second day following the application of mevinphos, Metasystox-R, and Dithane. California's regulations require a three-day interval before workers may enter a field sprayed with this combination of pesticides. The field was posted with appropriate warning signs in accordance with Monterey County regulations. As a result of this exposure, 33 workers had symptoms of organophosphate intoxication; 29 of them were hospitalized for up to 1-1/2 days, and all were removed from work for up to seven days.

In another major episode, 17 of 23 workers (who entered a citrus grove to rest after picking in an adjacent grove) became ill. It had been treated with parathion and was posted with signs prohibiting entry. The workers

rested under the trees, sitting in the duff (dried and decaying leaves and twigs). This duff material was later sampled, along with leaves in the groves where the workers were picking and where they were resting, and analyzed for parathion residues. Relatively high residues were found only in the duff material. None of these workers were hospitalized; several remained off work for up to five days.

In two separate episodes, three agricultural researchers entered treated fields in which the required reentry intervals had not yet expired. Both were posted with signs to prohibit entry. One was a corn field treated with methomyl and the other was an onion field treated with parathion. Cholinergic symptoms were reported for all three workers. No days of hospitalization were reported for any of the three workers, though two of them lost up to two days of work.

An irrigator was moving pipe in a broccoli field that had been treated with mevinphos the day before. It was posted with signs prohibiting entry. Mevinphos applications require a 48-hour interval before reentry for persons having significant and prolonged body contact with the treated plants.

An irrigator was moving pipe in a citrus grove that had just been treated with acephate. He was not wearing gloves or coveralls for this work. Acephate applications on citrus require a 21-day interval before reentry for substantial and prolonged body contact with the treated plants. He developed a headache and stomachache, but was not hospitalized and lost no days of work.

In separate incidents, three workers developed topical injuries as a result of entry into treated fields in which the reentry intervals had not expired. One was hoeing in a tomato field treated with endosulfan, methomyl, and sulfur; she developed a skin rash. One entered his own almond orchard immediately after propargite had been sprayed; he reported a "burning" feeling in his eyes. A field crew of five workers was ordered into a vineyard to work immediately following application with propargite; one worker developed an eye irritation.

DISCUSSION

Most cases reported involved topical injury or irritation--not systemic illness--to workers in Group #1. It can be seen from tables 2 and 3 that a few pesticides (sulfur, parathion, mevinphos, and propargite) and a few crops (grapes, citrus, and some vegetables) account for a large majority of all cases reported. There are a few simple and apparent reasons for this. Two entirely avoidable incidents caused most of the citrus and vegetable (parathion and mevinphos) cases. The many topical injuries reported for sulfur and propargite on grapes has an entirely different reason. There are relatively massive quantities of these two materials applied, in frequent applications, to a huge statewide acreage of grapes. There are several activities critical to the cultivation of table grapes that require a relatively high level of worker contact. Sulfur has a 24-hour reentry when applied to grapes; Omite 30W has a seven-day reentry interval on grapes. Considering the large acreage of grapes in California,

the large tonnage of irritating pesticides applied almost continuously, and the high hand labor demand, the number of reported cases of this type is relatively low.

Entry of workers into fields prior to expiration of the reentry interval continues to be a problem. There are a very few of these incidents each year, but one incident involving a large crew may result in many illnesses. Posting of all fields having reentry prohibitions has been suggested as a means of reducing the number of these illnesses. Unfortunately, the data available do not indicate this to be a solution. There was not a single reported incident in 1982 in which a systemic illness occurred in an unposted field with an unexpired reentry interval.

There were several incidents of workers entering fields prior to expiration of reentry intervals who were in Group #2. These were irrigators not prohibited from such entry by regulation. Department regulations are currently being modified to include irrigators who have substantial contact with treated pipe or equipment in the entry prohibition. There were no reported cases of workers in Group #3 becoming ill in incidents associated with entry into areas having unexpired reentry intervals.

CONCLUSIONS

Protection of farm field workers from exposure to pesticide residues has traditionally been accomplished using reentry intervals rather than use of protective clothing, training in safe work procedures, or some other prophylactic or engineering control. This will continue to be the primary vehicle of protection for this class of worker. The Department reviews required intervals on a constant and ongoing basis, in light of the best experimental and field data available. Best possible compliance with current regulations continues to be an important goal of the Department and county agricultural commissioners.

There remain some areas for consideration to further minimize the risk of hazard to field workers. Education as to the various ways of protecting themselves (i.e.: hygiene, work clothing, and work practices) is a largely unexplored area. Additional, selective requirements for posting or reentry intervals are also under review. It has been the Department's policy to register pesticides only in a manner compatible with maintaining potential pesticide exposure of agricultural field workers at negligible levels. Continuing this policy will be important in averting future illnesses and injuries to those workers who may be exposed to pesticide residues.

TABLE 1
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TYPES OF ILLNESS REPORTED FOR EACH SUB-GROUP OF
"WORKERS EXPOSED TO FIELD RESIDUE"
CLASSIFICATION

Illness	Group 1	Group 2	Group 3	Total
Systemic	68	9	3	80
Eye	20	7	4	31
Skin	175	19	5	199
Eye/Skin	13	0	0	13
Total	276	35	12	323

TABLE 1A
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TYPES OF ILLNESS REPORTED FOR EACH SUB-GROUP OF
"WORKERS EXPOSED TO FIELD RESIDUE" CLASSIFICATION
EXCLUDING "UNLIKELY" CASES

Illness	Group 1	Group 2	Group 3	Total
Systemic	56	8	2	66
Eye	11	4	1	16
Skin	118	14	4	136
Eye/Skin	12	0	0	12
Total	197	26	7	230

Group 1 - Conventional field workers. Employees of production agriculture who are exposed to foliar residues while picking, thinning, and hand cultivating.

Group 2 - Classified by CDFA prior to 1982 as "Tractor Drivers/Irrigators". Employees who normally have significantly lower exposure to foliar residues.

Group 3 - Classified by CDFA prior to 1982 as "Nursery/Greenhouse Workers, Residue". Employees who work in nurseries, greenhouses, or mushroom houses.

TABLE 2
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PESTICIDES ASSOCIATED WITH ILLNESSES TO
"WORKERS EXPOSED TO FIELD RESIDUE"

PESTICIDE	SYSTEMIC	EYE	SKIN	EYE/SKIN	TOTAL
ACEPHATE	1	0	0	0	1
ALDICARB	1	1	2	0	4
ANILAZINE	0	0	1	0	1
BAYLETON	0	1	1	0	2
BENOMYL	0	0	1	0	1
CAPTAN	0	2	3	0	5
CARBARYL	0	0	2	0	2
CHLOROTHALONIL	0	1	0	0	1
COPPER-ZINC SULFATE	0	0	1	0	1
DAMINOZIDE	0	0	1	0	1
DDVP	0	0	1	0	1
DIMETHOATE	1	0	1	0	2
DINITROPHENOL	0	0	0	1	1
ENDOSULFAN	0	1	2	0	3
ETHEPHON	0	0	1	0	1
MALATHION	1	0	0	0	1
METHIDATHION	1	0	0	0	1
METHOMYL	1	0	1	0	2
MEVINPHOS	1	0	1	0	2
MORESTAN	0	0	1	0	1
PARATHION	20	0	0	0	20
PIRIMICARB	1	0	1	0	2
PROPARGITE	1	2	17	0	20
PROPARGITE/SULFUR	0	0	2	0	2
SULFUR	3	14	79	10	106
TRIFLURALIN	1	0	0	0	1
NOT DETERMINED	47	9	80	2	138
TOTAL	80	31	199	13	323

TABLE 2A
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PESTICIDES ASSOCIATED WITH ILLNESSES TO
"WORKERS EXPOSED TO FIELD RESIDUE"
EXCLUDING "UNLIKELY" CASES

PESTICIDE	SYSTEMIC	EYE	SKIN	EYE/SKIN	TOTAL
ACEPHATE	1	0	0	0	1
ALDICARB	1	0	1	0	2
ANILAZINE	0	0	1	0	1
BENOMYL	0	0	1	0	1
CAPTAN	0	2	1	0	3
CHLOROTHALONIL	0	1	0	0	1
DAMINOZIDE	0	0	1	0	1
DDVP	0	0	1	0	1
DIMETHOATE	1	0	1	0	2
DINITROPHENOL	0	0	0	1	1
ENDOSULFAN	0	0	2	0	2
MALATHION	1	0	0	0	1
METHIDATHION	1	0	0	0	1
METHOMYL	1	0	1	0	2
MEVINPHOS	1	0	0	0	1
PARATHION	19	0	0	0	19
PIRIMICARB	0	0	1	0	1
PROPARGITE	1	2	14	0	17
PROPARGITE/SULFUR	0	0	2	0	2
SULFUR	2	11	68	10	91
TRIFLURALIN	1	0	0	0	1
NOT DETERMINED	36	0	41	1	78
TOTAL	66	16	136	12	230

TABLE 3
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CROPS ASSOCIATED WITH ILLNESS OF
"RESIDUE EXPOSURE TO FIELD WORKERS"

CROP	SYSTEMIC	EYE	SKIN	EYE/SKIN	TOTAL
ALMONDS	1	1	0	0	2
APPLES	0	0	1	0	1
ARTICHOKES	2	0	1	0	3
BEETS	0	1	0	0	1
BROCCOLI	1	0	0	0	1
CARROTS	1	0	0	0	1
CAULIFLOWER	34	0	1	0	35
CELERY	0	0	1	0	1
CHILES	0	0	1	0	1
CITRUS	1	0	0	0	1
CORN	2	1	2	0	5
COTTON	2	1	4	0	7
DATES	0	1	0	0	1
FIGS	0	0	1	0	1
GRAPES	7	16	138	1	162
LEMONS	0	0	1	10	11
LETTUCE	0	1	1	0	2
LETTUCE/CAULIFL	0	0	1	0	1
NECTARINES	0	0	3	0	3
OLIVES	0	0	2	0	2
ONIONS	2	0	1	0	3
ORANGES	18	0	3	0	21
ORNAMENTALS	1	1	1	0	3
PEACHES	0	1	1	0	2
PEARS	0	0	1	0	1
PIMENTOS	0	1	0	0	1
STRAWBERRIES	1	0	4	0	5
SUGAR BEETS	0	0	1	0	1
TOMATOES	0	0	2	0	2
NOT DETERMINED	7	6	27	2	42
TOTALS	80	31	199	13	323

TABLE 3A
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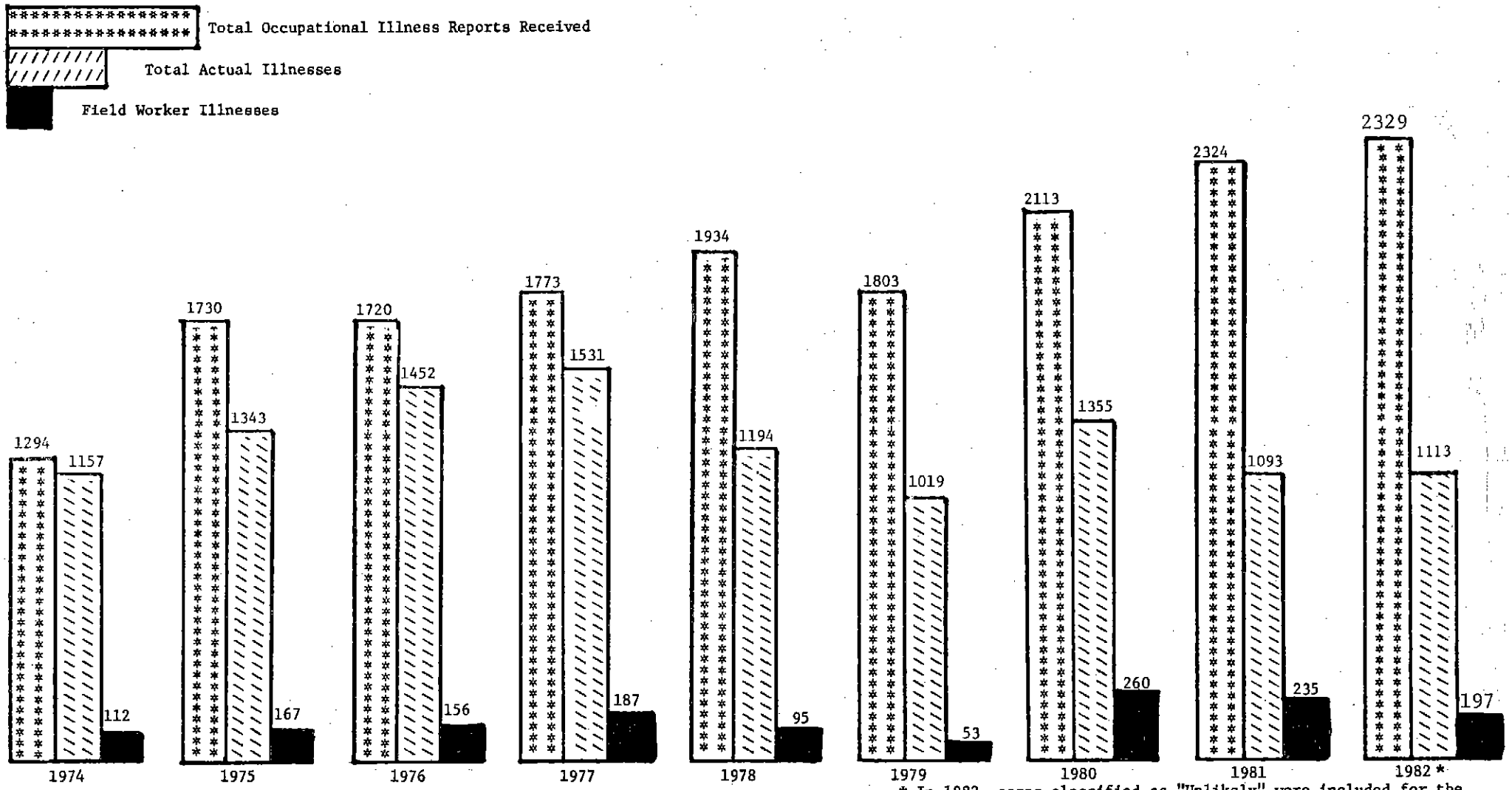
CROPS ASSOCIATED WITH ILLNESS OF
"RESIDUE EXPOSURE TO FIELD WORKERS"
EXCLUDING "UNLIKELY" CASES

CROP	SYSTEMIC	EYE	SKIN	EYE/SKIN	TOTAL
ALMONDS	1	1	0	0	2
APPLES	0	0	1	0	1
ARTICHOKES	2	0	0	0	2
BEETS	0	1	0	0	1
BROCCOLI	1	0	0	0	1
CAULIFLOWER	32	0	0	0	32
CELERY	0	0	1	0	1
CITRUS	1	0	0	0	1
CORN	2	0	2	0	4
COTTON	1	0	4	0	5
DATES	0	1	0	0	1
FIGS	0	0	1	0	1
GRAPES	2	10	107	1	120
LEMONS	0	0	0	10	10
LETTUCE/CAULIFL	0	0	1	0	1
NECTARINES	0	0	2	0	2
ONIONS	2	0	0	0	2
ORANGES	18	0	0	0	18
ORNAMENTALS	1	1	1	0	3
PEACHES	0	1	0	0	1
STRAWBERRIES	0	0	2	0	2
SUGAR BEETS	0	0	1	0	1
TOMATOES	0	0	2	0	2
NOT DETERMINED	3	1	11	1	16
TOTALS	66	16	136	12	230

GRAPH I

ANNUAL FIELD WORKER ILLNESSES COMPARED WITH
TOTAL OCCUPATIONAL PESTICIDE-RELATED ILLNESSES 1974 - 1982



* In 1982, cases classified as "Unlikely" were included for the first time. Lower figures are comparable to previous years.